JC03 Rec'd PCT/PTO 24 AUG 2001

*FORM PTO-1390 (REV 11-2000) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (If known, see 37 CFR 1 5)
449122007800	09/914158 Not yet Assigned

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE00/00315	2 February 2000	24 February 1999

TITLE OF INVENTION
METHOD FOR DETERMINING A COMMUNICATION PATH IN A COMMUNICATION NETWORK BETWEEN TWO NEIGHBORING NETWORK NODES

APPLICANT(S) FOR DO/EO/US
Clemens HAUBER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☒ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U S.C 371(c)(5))

Items 11. to 16. below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C 1 821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4)
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information: 1. International Preliminary Examination Report 2. International Search Report 3. Application Data Sheet 4 Return receipt postcard.

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D C on August 24, 2001

LaVerne Whetstone

dc-277034

U.S. APPLICATION NO (if known, see 37 CFR 1.5) 09/914158 Not Yet Assigned	INTERNATIONAL APPLICATION NO PCT/ DE00/00315	ATTORNEY'S DOCKET NUMBER. 449122007800

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....$1,000.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....$860.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....$710.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provision of PCT Article 33(1)-(4) $690.00

International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00

	CALCULATIONS PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$860.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$0	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	2 - 20 =	0	x $18.00	$0	
Independent claims	1 - 3 =	0	x $80.00	$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $270.00	$0	
			TOTAL OF ABOVE CALCULATIONS =	$860.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.				$0	
			SUBTOTAL =	$860.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$0	
			TOTAL NATIONAL FEE =	$860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 per property** +				$40.00	
			TOTAL FEES ENCLOSED =	$900.00	
				Amount to be refunded:	$
				charged:	$

a. ☒ Please charge my **Deposit Account No. 03-1952** in the amount of $ 900.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

b. ☒ The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Kevin R. Spivak
Morrison & Foerster LLP
2000 Pennsylvania Avenue, N.W.
Washington, D.C. 20006-1888

SIGNATURE

Kevin R. Spivak
Registration No. 43,148

dc-277034

PATENT
Docket No. 449122007800

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on August 24, 2001.

LaVerne Whetstone

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Clemens HAUBER

Serial No.: Not yet Assigned

Filing Date: August 24, 2001

For: METHOD FOR DETERMINING A COMMUNICATION PATH IN A COMMUNICATION NETWORK BETWEEN TWO NEIGHBORING NETWORK NODES

Examiner: Not yet Assigned

Group Art Unit: Not yet Assigned

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend this application as follows:

In the Specification:

Page 1 before the first paragraph, please delete the following:

~~Description~~

Please amend the title as follows:

METHOD FOR DETERMINING A CONNECTION PATH IN A COMMUNICATIONS NETWORK BETWEEN TWO ADJACENT NETWORK NODES.

Page 1, delete lines 7-8.

Page 1, between lines 8 and 9 has been amended to include the following:

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/00315 which was published in the German language on February 2, 2000.

TECHNICAL FIELD OF THE INVENTION

The invention relates to a method of determining a connection path in a network, and in particular, to determining a connection path in a communications network between adjacent network nodes.

BACKGROUND OF THE INVENTION

Paragraph beginning on line 15 of page 1 has been amended as follows:

In current communications networks, different traffic combinations are routed via the connection paths arranged between two or more network nodes. Thus, for example, information can be transmitted by a synchronous (STM) or an asynchronous (ATM) transfer mode. The information may have different bandwidths. Thus, information which is transmitted in the form

of narrowband signals is normally distinguished from information which is transmitted in the form of wideband or broadband signals. Special significance is therefore attached to the connection set-up between two adjacent nodes, i.e. network nodes interconnected via a trunk group.

Paragraph beginning on line 10 of page 2 has been amended as follows:

A hunting strategy of this type is disclosed in the document entitled "Probability of Loss of Data Traffics with different Bit Rates Hunting One Common PCM Channel, Proceedings of the 8th International Teletraffic Congress (ITC 8), 1976, pp. 525.1 -525.8, Lothar Katzschner, and Reinhard Scheller".

Paragraph beginning on line 25 of page 3 has been amended as follows:

The disadvantage of the described hunting strategy method is that, with high utilization of the trunk group, in the event of a connection request for a high bit rate connection, it may no longer be possible in some cases to accept this connection, since, although many gaps are available, none of them is large enough. Furthermore, in particular in the case of low utilization of the trunk group, uneven load distribution ("unbalanced load") results.

Page 3, between lines 33 and 34 has been amended to include the following heading:

SUMMARY OF THE INVENTION

In one embodiment of the invention, a method for determining a connection path in a communications network, comprising, routing a plurality of connections via a plurality of trunks between two adjacent network nodes and which reserve transmission capacities on the plurality trunks, determining which of the plurality of trunks, at least one additional connection is to be accommodated, using a search algorithm on the basis of an acceptance criterion to determine if the connection can still be accommodated, wherein a classification of the additional connection into two classes is carried out, performing a check when one of the classes is determined to be an

HBR in order to ascertain whether a freely available residual transmission capacity $C_r(T_i)$ of the determined trunk is equal to or greater than a peak bit rate of the additional connection and, the trunk whose free residual transmission capacity most exceeds the peak bit rate of the connection is selected from the determined trunks, and performing a check to ascertain whether a remainder from a modulo-division of the freely available residual transmission capacity $C_r(T_i)$ of the determined trunk by the peak bit rate of highest bit rate connections is equal to or greater than the peak bit rate of the additional connection and the trunk whose remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate connections least exceeds the peak bit rate of connection selected from the determined trunks, otherwise an additional search cycle is started to determine whether the freely available residual transmission capacity ($C_r(T_i)$) of the determined trunk is equal to or greater than the peak bit rate of the additional connection and, the trunk whose free residual transmission capacity least exceeds the peak bit rate of the connection is selected from the determined trunks.

In one aspect of the invention, there is the search cycle beginning with a first trunk of the plurality of trunks, and is applied to each trunk ($T_1 \ldots T_n$) and ends with the last trunk in the plurality of trucks.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in detail below with reference to an embodiment shown in the drawing, in which:

Fig. 1 shows an exemplary configuration on which the method according to the invention is carried out.

Fig. 2 shows an exemplary search algorithm according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Paragraph beginning on line 35 of page 3 has been amended as follows:

The invention discloses a way in which connection paths can be determined in a communications network, even with non-homogeneous traffic.

Please delete lines 1-3 of page 4.

Paragraph beginning on line 5 of page 4 has been amended as follows:

An advantageous feature of the invention is the provision of a new hunting strategy. The search to identify the largest gaps for high bit rate connections produces excellent results in terms of blocking probability and load distribution.

Please delete lines 4-5 of page 4.

Paragraph beginning on line 25 of page 4 has been amended as follows:

Fig. 1 shows a communications network. In this example, 4 network nodes $N_1 \ldots N_4$ are indicated. Of course, more or less network nodes can be used in the network. Two network nodes, for example network nodes N_1, N_4 are interconnected via a trunk group TG. A plurality of trunks $T_1 \ldots T_n$ are disposed in the trunk group TG. Each of the trunks $T_1 \ldots T_n$ has a specified transmission capacity C_s as the physical transmission parameter. The residual transmission capacity $C_r(T_i)$ (i=1…n) which is freely available for further connections is derived from the physical transmission capacity C_s minus the sum of the peak bit rates R_{pj} of the m connections (j=1, 2…,m) instantaneously carried thereover.

Paragraph beginning on line 4 of page 5 has been amended as follows:

It is assumed below that a connection V is to be set up from the network node N_1 to the network node N_4. The corresponding relationships are illustrated in Fig. 2.

Paragraph beginning on line 20 of page 5 has been amended as follows:

The hunting strategy typically begins with the first trunk T_1 of the trunk group TG and always ends with the last trunk T_n, for highest bit rate connections after one search cycle, and for non-highest bit rate connections after one or two search cycles.

Paragraph beginning on line 26 of page 5 has been amended as follows:

A highest bit rate connection V associated with class HBR is accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter most exceeds the peak bit rate of the connection. The new connection V is thus sorted into the "largest gap". As shown in Fig. 2, two criteria are thus required for sorting. On the one hand, the freely available residual transmission capacity of the trunk T_i currently being examined must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the free residual transmission capacity must most exceed the peak bit rate of the new connection V. To do this, a variable C_r_Letzt_Optimum is introduced, in which the greatest currently determined value is always recorded. For the highest bit rate connections of the class HBR, the search always ends accordingly after one search cycle.

Paragraph beginning on line 4 of page 6 has been amended as follows:

If the new connection V is a non-highest bit rate connection which is allocated to the class N-HBR, it is accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter, following subtraction of a largest possible multiple of the peak bit rate R_p(HBR) of highest bit rate connections ("ensuring the largest gaps for high bit rate connections"), least exceeds the peak bit rate of the connection V. The new connection V is thus sorted into the "smallest gap following subtraction of the largest possible reservation budget for connections of the class HBR". As shown in Fig. 2, there are two criteria for sorting. On the one hand, the remainder from modulo-division of the freely available residual transmission capacity of the currently examined trunk T_i by the peak bit rate of highest bit rate connections must be equal to

or greater than the peak bit rate of the new connection V. On the other hand, the remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate connections must least exceed the peak bit rate of the new connection V. To do this, a variable C_r_Letzt_Optimum is introduced here also, in which the lowest currently determined value is always recorded. If the search according to the aforementioned criteria is successful, the search ends after one search cycle for non-highest bit rate connections of the class N-HBR.

Paragraph beginning on line 33 of page 6 has been amended as follows:

If the new connection V cannot be sorted on any of the trunks, a second search cycle is started. The connection V is then - without taking into account a reservation budget for connections of the class HBR -accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter least exceeds the peak bit rate of the connection. The new connection V is thus sorted into the "smallest gap". As shown in Fig. 2, there are two criteria for sorting. On the one hand, the freely available residual transmission capacity of the currently examined trunk T_i must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the free residual transmission capacity must least exceed the peak bit rate of the new connection V. To do this, the lowest currently determined value is always recorded in the variable C_r_Letzt_Optimum. For non-highest bit rate connections of the class N-HBR, the search ends accordingly after this second search cycle at the latest.

On page 8, line 1, please replace "Claims" with --WHAT IS CLAIMED IS--.

In the Claims:

1. (Amended) A method for determining a connection path in a communications network, comprising:

routing a plurality of connections via a plurality of trunks between two adjacent network nodes and which reserve transmission capacities on the plurality of trunks;

determining which of the plurality of trunks at least one additional connection is to be accommodated, using a search algorithm on the basis of an acceptance criterion to determine if the connection can still be accommodated, wherein

a classification of the additional connection into two classes is carried out; and

performing a check when one of the classes is determined to be an HBR in order to ascertain whether a freely available residual transmission capacity $C_r(T_i)$ of the determined trunk is equal to or greater than a peak bit rate of the additional connection and the trunk whose free residual transmission capacity most exceeds the peak bit rate of the connection is selected from the determined trunks, and

performing a check when one of the classes is determined to be a N-HBR in order to ascertain whether a remainder from a modulo-division of the freely available residual transmission capacity $C_r(T_i)$ of the determined trunk by the peak bit rate of highest bit rate connections is equal to or greater than the peak bit rate of the additional connection and the trunk whose remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate connections least exceeds the peak bit rate of connection selected from the determined trunks, otherwise an additional search cycle is started to determine whether the freely available residual transmission capacity ($C_r(T_i)$) of the determined trunk is equal to or greater than the peak bit rate of the additional connection and, the trunk whose free residual transmission capacity least exceeds the peak bit rate of the connection is selected from the determined trunks.

2. (Amended) The method according to claim 1,

wherein

the search cycle begins with a first trunk of the plurality of trunks and is applied to each trunk and ends with the last trunk in the plurality of trucks.

In the Abstract:

Please replace the Abstract in its entirety with the Abstract attached hereto.

REMARKS

The above amendments to the specification, claims and abstract have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 449122007800. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: August 24, 2001

By: _____
Kevin R. Spivak
Registration No. 43,148

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Facsimile: (202) 263-8396

VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Specification:

Page 1 before the first paragraph, please delete the following:

~~Description~~

METHOD FOR DETERMINING A CONNECTION PATH IN A COMMUNICATIONS NETWORK BETWEEN TWO ADJACENT NETWORK NODES.

Page 1, line 7, please delete the following:

~~The invention relates to a method according to the preamble to claim 1.~~

Page 1, between lines 8 and 9 has been amended to include the following:

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/00315 which was published in the German language on February 2, 2000.

TECHNICAL FIELD OF THE INVENTION

The invention relates to a method of determining a connection path in a network, and in particular, to determining a connection path in a communications network between adjacent network nodes.

BACKGROUND OF THE INVENTION

Paragraph beginning on line 15 of page 1 has been amended as follows:

In current communications networks, different traffic combinations are routed via the connection paths arranged between two or more network nodes. Thus, for example, information can be transmitted by ~~means of~~ a synchronous (STM) or an asynchronous (ATM) transfer mode. The information may have different bandwidths. Thus, information which is transmitted in the form of narrowband signals is normally distinguished from information which is transmitted in the form of wideband or broadband signals. Special significance is therefore attached to the connection set-up between two adjacent nodes, i.e. network nodes interconnected via a trunk group.

Paragraph beginning on line 10 of page 2 has been amended as follows:

A hunting strategy of this type is disclosed in the ~~known from the~~ document entitled "Probability of Loss of Data Traffics with different Bit Rates Hunting One Common PCM Channel, Proceedings of the 8th International Teletraffic Congress (ITC 8), 1976, pp. 525.1 - 525.8, Lothar Katzschner, and Reinhard Scheller".

Paragraph beginning on line 25 of page 3 has been amended as follows:

The disadvantage of the described ~~known~~ hunting strategy method is that, with high utilization of the trunk group, in the event of a connection request for a high bit rate connection, it may no longer be possible in some cases to accept this connection, since, although many gaps are available, none of them is large enough. Furthermore, in particular in the case of low utilization of the trunk group, uneven load distribution ("unbalanced load") results.

Page 3, between lines 33 and 34 has been amended to include the following heading:

SUMMARY OF THE INVENTION

In one embodiment of the invention, a method for determining a connection path in a communications network, comprising, routing a plurality of connections via a plurality of trunks

between two adjacent network nodes and which reserve transmission capacities on the plurality trunks, determining which of the plurality of trunks, at least one additional connection is to be accommodated, using a search algorithm on the basis of an acceptance criterion to determine if the connection can still be accommodated, wherein a classification of the additional connection into two classes is carried out, performing a check when one of the classes is determined to be an HBR in order to ascertain whether a freely available residual transmission capacity $C_r(T_i)$ of the determined trunk is equal to or greater than a peak bit rate of the additional connection and, the trunk whose free residual transmission capacity most exceeds the peak bit rate of the connection is selected from the determined trunks, and performing a check to ascertain whether a remainder from a modulo-division of the freely available residual transmission capacity $C_r(T_i)$ of the determined trunk by the peak bit rate of highest bit rate connections is equal to or greater than the peak bit rate of the additional connection and the trunk whose remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate connections least exceeds the peak bit rate of connection selected from the determined trunks, otherwise an additional search cycle is started to determine whether the freely available residual transmission capacity ($C_r(T_i)$) of the determined trunk is equal to or greater than the peak bit rate of the additional connection and, the trunk whose free residual transmission capacity least exceeds the peak bit rate of the connection is selected from the determined trunks.

In one aspect of the invention, there is the search cycle beginning with a first trunk of the plurality of trunks, and is applied to each trunk ($T_1 \ldots T_n$) and ends with the last trunk in the plurality of trucks.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in detail below with reference to an embodiment shown in the drawing, in which:

Fig. 1 shows an exemplary configuration on which the method according to the invention is carried out.

Fig. 2 shows an exemplary search algorithm according to the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Paragraph beginning on line 35 of page 3 has been amended as follows:

The ~~object of the~~ invention ~~is to indicate~~ discloses a way in which connection paths can be determined in a communications network, even with non-homogeneous traffic.

Paragraph beginning on line 1 of page 4 has been amended as follows:

~~The object is achieved on the basis of the features indicated in the preamble to claim 1 by means of the features indicated in the characterizing part.~~

Paragraph beginning on line 5 of page 4 has been amended as follows:

An ~~particularly~~ advantageous feature of the invention is the provision of a new hunting strategy. The search to identify the largest gaps for high bit rate connections produces excellent results in terms of blocking probability and load distribution. ~~The search to find the smallest suitable gap used in the state of the art is thus clearly surpassed.~~

Paragraph beginning on line 13 of page 4 has been amended as follows:

~~Advantageous further developments of the invention are indicated in subclaim 2.~~

~~The invention is explained in detail below with reference to an embodiment shown in the drawing, in which:~~

~~Fig 1 shows the configuration on which the method according to the invention is carried out;~~

~~Fig 2 shows the search algorithm according to the invention.~~

Paragraph beginning on line 25 of page 4 has been amended as follows:

Fig. 1 shows a communications network. ~~For the sake of simplicity, only~~ In this example, 4 network nodes $N_1 \ldots N_4$ are indicated. Of course, more or less network nodes can be used in the network. Two network nodes, for example network nodes N_1, N_4 are interconnected via a trunk group TG. A plurality of trunks $T_1 \ldots T_n$ are disposed in the trunk group TG. Each of the trunks $T_1 \ldots T_n$ has a specified transmission capacity C_s as the physical transmission parameter. The residual transmission capacity $C_r(T_i)$ (i=1…n) which is freely available for further connections is derived from the physical transmission capacity C_s minus the sum of the peak bit rates R_{pj} of the m connections (j=1, 2…,m) instantaneously carried thereover.

Paragraph beginning on line 4 of page 5 has been amended as follows:

It is assumed below that a connection V is to be set up from the network node N_1 to the network node N_4. The corresponding relationships are illustrated in ~~f~~Fig. 2.

Paragraph beginning on line 20 of page 5 has been amended as follows:

The hunting strategy typically begins ~~is generally started~~ with the first trunk T_1 of the trunk group TG and always ends with the last trunk T_n, for highest bit rate connections after one search cycle, and for non-highest bit rate connections after one or two search cycles.

Paragraph beginning on line 26 of page 5 has been amended as follows:

A highest bit rate connection V associated with class HBR is accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter most exceeds the peak bit rate of the connection. The new connection V is thus sorted into the "largest gap". As shown in ~~f~~Fig. 2, two criteria are thus required for sorting. On the one hand, the freely available residual transmission capacity of the trunk T_i currently being examined must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the free residual transmission capacity must most exceed the peak bit rate of the new connection V. To do this, a variable

C_r_Letzt_Optimum is introduced, in which the greatest currently determined value is always recorded. For the highest bit rate connections of the class HBR, the search always ends accordingly after one search cycle.

Paragraph beginning on line 4 of page 6 has been amended as follows:

If the new connection V is a non-highest bit rate connection which is allocated to the class N-HBR, it is accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter, following subtraction of a largest possible multiple of the peak bit rate R_p(HBR) of highest bit rate connections ("ensuring the largest gaps for high bit rate connections"), least exceeds the peak bit rate of the connection V. The new connection V is thus sorted into the "smallest gap following subtraction of the largest possible reservation budget for connections of the class HBR". As shown in ~~f~~Fig. 2, there are two criteria ~~are thus required~~ for sorting. On the one hand, the remainder from modulo-division of the freely available residual transmission capacity of the currently examined trunk T_i by the peak bit rate of highest bit rate connections must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate connections must least exceed the peak bit rate of the new connection V. To do this, a variable C_r_Letzt_Optimum is introduced here also, in which the lowest currently determined value is always recorded. If the search according to the aforementioned criteria is successful, the search ends after one search cycle for non-highest bit rate connections of the class N-HBR.

Paragraph beginning on line 33 of page 6 has been amended as follows:

If the new connection V cannot be sorted on any of the trunks, a second search cycle is started. The connection V is then - without taking into account a reservation budget for connections of the class HBR -accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter least exceeds the peak bit rate of the connection. The new

connection V is thus sorted into the "smallest gap". As shown in Fig. 2, there are two criteria ~~are required~~ for sorting. On the one hand, the freely available residual transmission capacity of the currently examined trunk T_i must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the free residual transmission capacity must least exceed the peak bit rate of the new connection V. To do this, the lowest currently determined value is always recorded in the variable C_r_Letzt_Optimum. For non-highest bit rate connections of the class N-HBR, the search ends accordingly after this second search cycle at the latest.

On page 8, line 1, please replace "Claims" with --WHAT IS CLAIMED IS--.

In the Claims:

1. (Amended) A method for determining a connection path in a communications network, ~~with~~ comprising:

routing a plurality of connections ~~which are in each case routed~~ via a ~~further~~ plurality of trunks ~~(T_1...T_n)~~ between two adjacent network nodes ~~(N_1...N_4),~~ and which reserve transmission capacities ~~(R_{pj})~~ on these plurality of trunks; ~~(T_1...T_n), and with~~

determining which of the plurality of trunks at least one ~~further~~ additional connection ~~(V), which~~ is ~~also~~ to be accommodated, using a ~~on one of these trunks (T_1...T_n) in that a~~ search algorithm ~~determines the trunk (T_1...T_n) on which,~~ on the basis of an acceptance criterion~~, this~~ to determine if the connection ~~(V)~~ can still be accommodated, wherein

~~characterized in that~~

a classification of the ~~(at least one) further~~ additional connection ~~(V)~~ into two classes ~~(HBR, N-HBR)~~ is carried out~~;~~; and

performing a check when one of the classes is determined to be an HBR in order ~~is carried out in the event of association with one class (HBR)~~ to ascertain whether a ~~the~~ freely available residual transmission capacity $C_r(T_i)$ of the ~~currently investigated~~ determined trunk ~~(T_i)~~ is equal to or greater than a ~~the~~ peak bit rate of the additional ~~(at least one) further~~ connection ~~(V)~~ and~~, in this case,~~ the trunk whose free residual transmission capacity most exceeds the peak bit rate of the ~~this~~ connection ~~(V)~~ is selected from the determined trunks ~~determined in this way~~, and

~~in the event of association with the remaining class (N-HBR),~~ performing a check ~~is carried out~~ when one of the classes is determined to be a N-HBR in order to ascertain whether ~~the~~ a remainder from a modulo-division of the freely available residual transmission capacity $C_r(T_i)$ of the ~~currently investigated~~ determined trunk ~~(T_i)~~ by the peak bit rate ~~(R_p(HBR))~~ of highest bit rate connections is equal to or greater than the peak bit rate of the ~~(at least one) further~~ additional connection ~~(V)~~ and~~, in this case,~~ the trunk whose remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate

connections least exceeds the peak bit rate of ~~this~~ connection ~~(V) is~~ selected from the determined trunks, ~~determined in this way, or~~ otherwise ~~a further~~ an additional search cycle is started to determine ~~check~~ whether the freely available residual transmission capacity ($C_r(T_i)$) of the ~~currently investigated~~ determined trunk ~~(T_i)~~ is equal to or greater than the peak bit rate of the ~~(at least one) further~~ additional connection ~~(V)~~ and, ~~in this case,~~ the trunk whose free residual transmission capacity least exceeds the peak bit rate of ~~this~~ the connection ~~(V)~~ is selected from the determined trunks. ~~determined in this way.~~

2. (Amended) The method according to claim 1,

~~characterized in that~~

wherein

the ~~a~~ search cycle ~~of the hunting strategy is started~~ begins with ~~the~~ a first trunks ~~(T_1)~~ of the plurality of trunks ~~group (TG),~~ and is applied to ~~all~~ each trunks ~~(T_1...T_n)~~ and ends with the last trunk in the plurality of trucks ~~(T_n)~~.

In the Abstract:

Please replace the Abstract in its entirety with the Abstract attached hereto.

METHOD FOR DETERMINING A CONNECTION PATH IN A COMMUNICATIONS NETWORK BETWEEN TWO ADJACENT NETWORK NODES

Abstract

In order to authorize a connection on a trunk group comprising a plurality of trunks between two adjacent network nodes, a search algorithm determines the trunk on which this connection can still be accommodated. To do this, a classification of this new connection is first carried out, according to which different search cycles are instigated, with which a trunk with adequate free residual transmission capacity is determined. If the search is unsuccessful, the connection is rejected.

GR 99 P 1266

Description 3/prts

Method for determining a connection path in a communications network between two adjacent network nodes.

The invention relates to a method according to the preamble to claim 1.

Current communications networks have a plurality of network nodes which are intermeshed via connection paths. These are formed from a plurality of trunks which are combined to form trunk groups.

In current communications networks, different traffic combinations are routed via the connection paths arranged between two or more network nodes. Thus, for example, information can be transmitted by means of a synchronous (STM) or an asynchronous (ATM) transfer mode. The information may have different bandwidths. Thus, information which is transmitted in the form of narrowband signals is normally distinguished from information which is transmitted in the form of wideband or broadband signals. Special significance is therefore attached to the connection set-up between two adjacent nodes, i.e. network nodes interconnected via a trunk group.

Two decisions generally need to be made when a connection is set up in order to determine a connection path between two adjacent network nodes. On the one hand, it must be decided which of the trunks of the trunk group which connects the network node in question still has adequate free capacity in order to set up a connection.

On the other hand, one of the connection paths which is conceivable in terms of available capacity must be selected in such a way that

optimum grade of service is achieved. This is necessary insofar as the selected connection path is intended to ensure minimal blocking probability and associated low connection loss probability for subsequent connections.

A method with which these two tasks (search and selection) can be performed is referred to as a hunting strategy.

A hunting strategy of this type is known from the document entitled "Probability of Loss of Data Traffics with different Bit Rates Hunting One Common PCM Channel, Proceedings of the 8th International Teletraffic Congress (ITC 8), 1976, pp. 525.1 -525.8, Lothar Katzschner, and Reinhard Scheller".

According to this document, a sequential search of all relevant trunks is carried out. An attempt is made here to determine the "smallest gap", which can still accommodate the new connection. The search process is started with the first trunk in the trunk group and is continued step-by-step until all trunks are checked. On the one hand, the transmission capacity which is still freely available on the trunk in relation to the peak bit rate of the connection which is to be accommodated is used as the selection criterion. An investigation is carried out to ascertain whether the transmission capacity which is still freely available is equal to or greater than the peak bit rate of this connection. In practice, a plurality of trunks may satisfy this criterion. On the other hand, the trunk on which the least residual transmission capacity remains on acceptance of the new connection is then determined. The new connection is accepted on this trunk. If no adequate free transmission capacity is found, the connection concerned is rejected.

This known method was developed in particular for a homogeneous traffic characteristic, where each connection set-up began with the same capacity requirement of 64 kbit/s per connection. However, this traffic homogeneity on connection set-up is often no longer available in current communications networks. Along with conventional 64 kbit/s narrowband connections, n x 64 kbit/s wideband connections, for example, occur (in the case of STM-based, connection-oriented, multiple-rate services), or even broadband connections with any given bit rate granularity in the case of ATM traffic.

However, this creates completely new requirements for the connection set-up. Thus, the traffic performance capability must equally be as high and robust as possible with minimal reciprocal interference for all traffic types. In the case of ATM traffic, this results in the requirement for load distribution which is as even as possible over all trunks of a trunk group. Otherwise, connections on trunks with high utilization would suffer a greater delay period in the associated queues than on trunks with lower utilization.

The disadvantage of the known hunting strategy method is that, with high utilization of the trunk group, in the event of a connection request for a high bit rate connection, it may no longer be possible in some cases to accept this connection, since, although many gaps are available, none of them is large enough. Furthermore, in particular in the case of low utilization of the trunk group, uneven load distribution ("unbalanced load") results.

The object of the invention is to indicate a way in which connection paths can be determined in a

communications network, even with non-homogeneous traffic.

The object is achieved on the basis of the features indicated in the preamble to claim 1 by means of the features indicated in the characterizing part.

A particularly advantageous feature of the invention is the provision of a new hunting strategy. The search to identify the largest gaps for high bit rate connections produces excellent results in terms of blocking probability and load distribution. The search to find the smallest suitable gap used in the state of the art is thus clearly surpassed.

Advantageous further developments of the invention are indicated in subclaim 2.

The invention is explained in detail below with reference to an embodiment shown in the drawing, in which:

Fig 1 shows the configuration on which the method according to the invention is carried out;

Fig 2 shows the search algorithm according to the invention.

Fig 1 shows a communications network. For the sake of simplicity, only 4 network nodes $N_1 \ldots N_4$ are indicated. Two network nodes, for example network nodes N_1, N_4 are interconnected via a trunk group TG. A plurality of trunks $T_1 \ldots T_n$ are disposed in the trunk group TG. Each of the trunks $T_1 \ldots T_n$ has a specified transmission capacity C_s as the physical transmission parameter. The residual transmission capacity $C_r(T_i)$ $(i=1 \ldots n)$ which is freely available for further connections is derived from the physical transmission capacity C_s minus the sum

of the peak bit rates R_{pj} of the m connections (j=1, 2...,m) instantaneously carried thereover.

It is assumed below that a connection V is to be set up from the network node N_1 to the network node N_4. The corresponding relationships are illustrated in fig. 2.

Accordingly, a classification of the connections into highest bit rates and non-highest bit rate connections HBR, N-HBR is initially carried out. The criterion determining which connections are to be regarded as having the highest bit rate, is, for example, prescribed by the corresponding service. The trunks $T_1...T_n$ are then subsequently examined to ascertain whether the new connection V can be accommodated. A different hunting strategy is adopted according to the association of the connection V with the classes HBR, N-HBR.

The hunting strategy is generally started with the first trunk T_1 of the trunk group TG and always ends with the last trunk T_n, for highest bit rate connections after one search cycle, and for non-highest bit rate connections after one or two search cycles.

A highest bit rate connection V associated with class HBR is accepted on one of the trunks $T_1...T_n$ if the free residual transmission capacity of the latter most exceeds the peak bit rate of the connection. The new connection V is thus sorted into the "largest gap". As shown in fig 2, two criteria are thus required for sorting. On the one hand, the freely available residual transmission capacity of the trunk T_i currently being examined must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the

free residual transmission capacity must most exceed the peak bit rate of the new connection V. To do this, a variable C_r_Letzt_Optimum is introduced, in which the greatest currently determined value is always recorded. For the highest bit rate connections

of the class HBR, the search always ends accordingly after one search cycle.

If the new connection V is a non-highest bit rate connection which is allocated to the class N-HBR, it is accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter, following subtraction of a largest possible multiple of the peak bit rate R_p(HBR) of highest bit rate connections ("ensuring the largest gaps for high bit rate connections"), least exceeds the peak bit rate of the connection V. The new connection V is thus sorted into the "smallest gap following subtraction of the largest possible reservation budget for connections of the class HBR". As shown in fig. 2, two criteria are thus required for sorting. On the one hand, the remainder from modulo-division of the freely available residual transmission capacity of the currently examined trunk T_i by the peak bit rate of highest bit rate connections must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the remainder from modulo-division of the free residual transmission capacity by the peak bit rate of highest bit rate connections must least exceed the peak bit rate of the new connection V. To do this, a variable C_r_Letzt_Optimum is introduced here also, in which the lowest currently determined value is always recorded. If the search according to the aforementioned criteria is successful, the search ends after one search cycle for non-highest bit rate connections of the class N-HBR.

If the new connection V cannot be sorted on any of the trunks, a second search cycle is started. The connection V is then - without taking into account a reservation budget for connections of the class HBR -

accepted on one of the trunks $T_1 \ldots T_n$ if the free residual transmission capacity of the latter least exceeds the peak bit rate of the connection. The new connection V is thus sorted into the "smallest gap". As shown

in Fig. 2, two criteria are required for sorting. On the one hand, the freely available residual transmission capacity of the currently examined trunk T_i must be equal to or greater than the peak bit rate of the new connection V. On the other hand, the free residual transmission capacity must least exceed the peak bit rate of the new connection V. To do this, the lowest currently determined value is always recorded in the variable C_r_Letzt_Optimum. For non-highest bit rate connections of the class N-HBR, the search ends accordingly after this second search cycle at the latest.

The current embodiment has referred to connections in general. This may involve connections of any given type. Thus, connections which transmit information according to a synchronous transfer method (STM) can be set up using the method according to the invention as well as connections which transmit information according to an asynchronous transfer mode (ATM).

Claims

1. A method for determining a connection path in a communications network, with

a plurality of connections which are in each case routed via a further plurality of trunks ($T_1 \ldots T_n$) between two adjacent network nodes ($N_1 \ldots N_4$), and which reserve transmission capacities (R_{pj}) on these trunks ($T_1 \ldots T_n$), and with

at least one further connection (V), which is also to be accommodated on one of these trunks ($T_1 \ldots T_n$) in that a search algorithm determines the trunk ($T_1 \ldots T_n$) on which, on the basis of an acceptance criterion, this connection (V) can still be accommodated,

characterized in that

a classification of the (at least one) further connection (V) into two classes (HBR, N-HBR) is carried out,

a check is carried out in the event of association with one class (HBR) to ascertain whether the freely available residual transmission capacity $C_r(T_i)$ of the currently investigated trunk (T_i) is equal to or greater than the peak bit rate of the (at least one) further connection (V) and, in this case, the trunk whose free residual transmission capacity most exceeds the peak bit rate of this connection (V) is selected from the trunks determined in this way, and

in the event of association with the remaining class (N-HBR), a check is carried out to ascertain whether the remainder from modulo-division of the freely available residual transmission capacity $C_r(T_i)$ of the currently investigated trunk (T_i) by the peak bit rate (R_p(HBR)) of highest bit rate connections is equal to or greater than the peak bit rate of the (at least one) further connection (V) and, in this case, the trunk whose remainder from modulo-division of the free

residual transmission capacity by the peak bit rate of highest bit rate connections least exceeds the peak bit rate of this connection (V) is selected from the trunks determined in this way, or

otherwise a further search cycle is started to check whether the freely available residual transmission capacity ($C_r(T_i)$) of the currently investigated trunk (T_i) is equal to or greater than the peak bit rate of the (at least one) further connection (V) and, in this case, the trunk whose free residual transmission capacity least exceeds the peak bit rate of this connection (V) is selected from the trunks determined in this way.

2. The method according to claim 1,
characterized in that
a search cycle of the hunting strategy is started with the first trunks (T_1) of the trunk group (TG), is applied to all trunks ($T_1 \ldots T_n$) and ends with the last trunk (T_n).

Abstract

Method for determining a connection path in a communications network between two adjacent network nodes

In order to authorize a connection on a trunk group comprising a plurality of trunks between two adjacent network nodes, a search algorithm determines the trunk on which this connection can still be accommodated. To do this, a classification of this new connection is first carried out, according to which different search cycles are instigated, with which a trunk with adequate free residual transmission capacity is determined. If the search is unsuccessful, the connection is rejected.

FIG 1

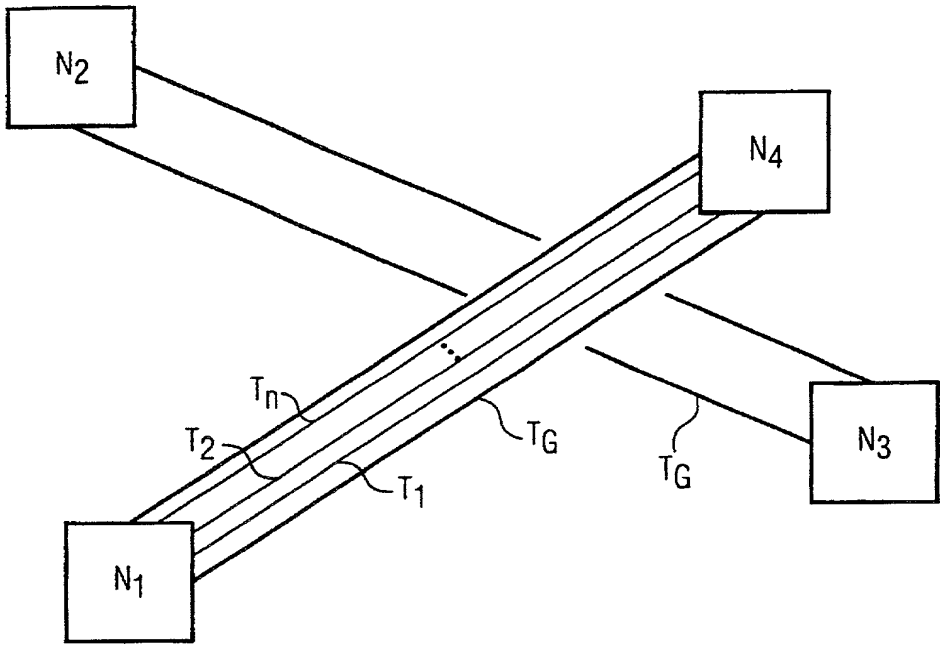


FIG 2A

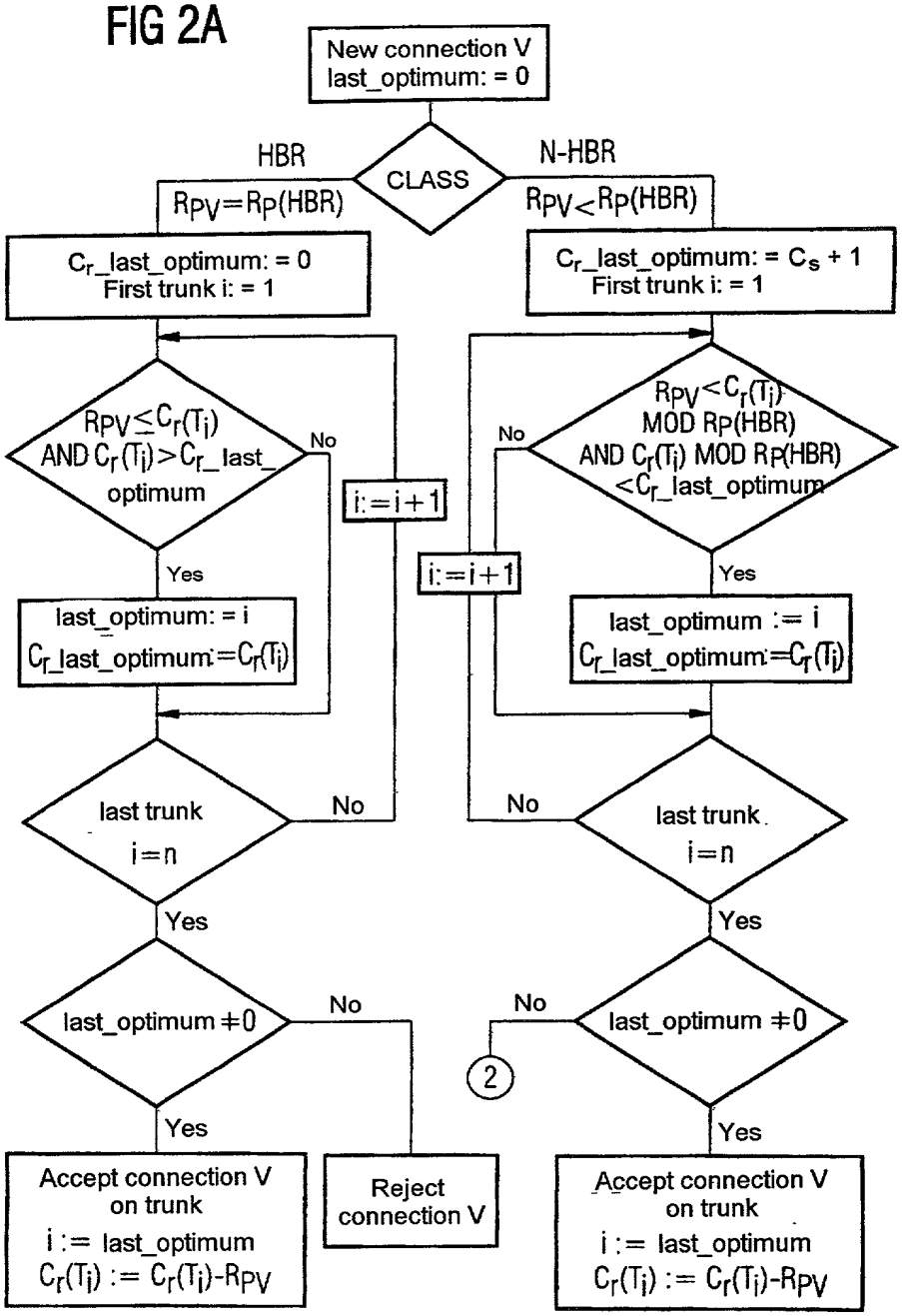
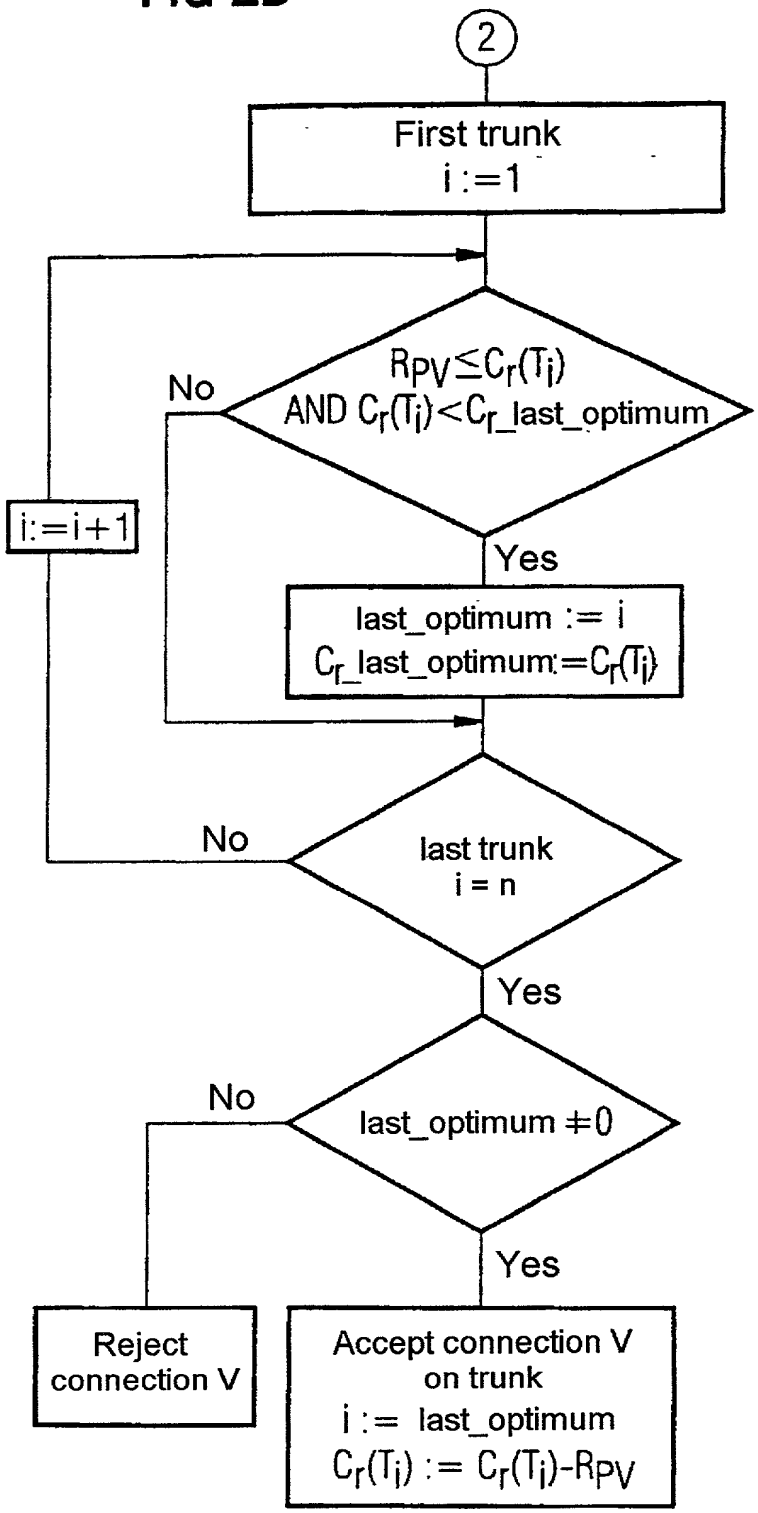

New connection V
last_optimum: = 0
CLASS
HBR
RPV=RP(HBR)
N-HBR
RPV<RP(HBR)
Cr_last_optimum: = 0
First trunk i: = 1
Cr_last_optimum: = Cs + 1
First trunk i: = 1
RPV≤Cr(Ti)
AND Cr(Ti)>Cr_last_optimum
No
Yes
last_optimum: = i
Cr_last_optimum:=Cr(Ti)
i:=i+1
last trunk
i=n
No
Yes
last_optimum≠0
No
Yes
Accept connection V
on trunk
i := last_optimum
Cr(Ti) := Cr(Ti)-RPV
Reject
connection V
RPV<Cr(Ti)
MOD RP(HBR)
AND Cr(Ti) MOD RP(HBR)
<Cr_last_optimum
No
Yes
last_optimum := i
Cr_last_optimum:=Cr(Ti)
i:=i+1
last trunk
i=n
No
Yes
last_optimum≠0
No
Yes
2
Accept connection V
on trunk
i := last_optimum
Cr(Ti) := Cr(Ti)-RPV

FIG 2B


2
First trunk
i :=1
$R_{PV} \leq C_r(T_i)$
AND $C_r(T_i) < C_{r\_last\_optimum}$
No
Yes
i:=i+1
last_optimum := i
$C_{r\_last\_optimum} := C_r(T_i)$
last trunk
i = n
No
Yes
last_optimum ≠0
No
Yes
Reject
connection V
Accept connection V
on trunk
i := last_optimum
$C_r(T_i) := C_r(T_i) - R_{PV}$

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

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I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Verfahren zum Ermitteln eines Verbindungsweges in einem Kommunikationsnetz zwischen zwei benachbarten Netzknoten

Method for determining a communication path in a communication network between two neighboring network nodes

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am 02.02.2000 als
PCT internationale Anmeldung
PCT Anmeldungsnummer PCT/DE00/00315
eingereicht wurde und am _____
abgeändert wurde (falls tatsächlich abgeändert).

(check one)
☐ is attached hereto.
☒ was filed on 02.02.2000 as
PCT international application
PCT Application No. PCT/DE00/00315
and was amended on _____
(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications Priorität beansprucht			Priority Claimed	
19907923.4 (Number) (Nummer)	DE (Country) (Land)	24.02.1999 (Day Month Year Filed) (Tag Monat Jahr eingereicht)	☒ Yes Ja	☐ No Nein
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	☐ Yes Ja	☐ No Nein
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	☐ Yes Ja	☐ No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/DE00/00315 (Application Serial No.) (Anmeldeseriennummer)	02.02.2000 (Filing Date D, M, Y) (Anmeldedatum T, M, J)	anhängig (Status) (patentiert, anhängig, aufgegeben)	pending (Status) (patented, pending, abandoned)
_____ (Application Serial No.) (Anmeldeseriennummer)	(Filing Date D,M,Y) (Anmeldedatum T, M; J)	_____ (Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

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Direct Telephone Calls to: *(name and telephone number)*

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2000 Pennsylvania Ave., NW 20006-1888 Washington, DC
Telephone: (001) 202 887 1500 and Facsimile (001) 202 887 0763
or
Customer No. 25227

Voller Name des einzigen oder ursprünglichen Erfinders:	Full name of sole or first inventor:
CLEMENS HAUBER	CLEMENS HAUBER
Unterschrift des Erfinders Datum	Inventor's signature Date
Clemens Hauber 12.06.01	
Wohnsitz	Residence
MUENCHEN, DEUTSCHLAND	MUENCHEN, GERMANY DEX
Staatsangehörigkeit	Citizenship
DE	DE
Postanschrift	Post Office Addess
BLEIBTREUSTR.19 D	BLEIBTREUSTR.19 D
81479 MUENCHEN	81479 MUENCHEN
Voller Name des zweiten Miterfinders (falls zutreffend):	Full name of second joint inventor, if any:
Unterschrift des Erfinders Datum	Second Inventor's signature Date
Wohnsitz	Residence
,	,
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).